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ABSTRACT

This manual for secondary school teachers offers sample lesson plans that may be used to guide and stimulate experimentation and development of creative instructional units. Lesson plan components are defined, and various types of lessons and their significant characteristics are identified. These characteristic types of lessons are illustrated, and planning elements common to all lessons are shown. The relationship between the basic aspects of planning is illustrated. The sample lesson plans cover: (1) supervised study; (2) using audio-visual aids; (3) developmental lessons; (4) dramatization; (5) reporting lessons; (6) debate/panel forum; (7) hands-on experience; (8) inquiry; (9) pre-test review; (10) post-test review; (11) skills; (12) library; and (13) class trips. A section is devoted to integrating reading and writing components, and sample lesson plans are presented in English, social studies, and science, demonstrating how reading and writing activities can be taught without diminishing content. (JD)

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HOW DOES A LESSON PLAN?

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Curriculum and Instruction

Division of High Schools

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FOREWORD

Ladies and Gentlemen:

How does a lesson plan....

These sample lesson were presented to trigger professional discussions and to serve as a stimulus to imaginative teaching, not to impose a format or to stifle creativity. Note the differences in style:

- Some teachers supplement their plans with identification of content to be covered; others do not.
- Some teachers conclude their lessons with summaries, others with applications, still others with both.
- Some teachers include extra credit assignments; others do not.
- Some teachers provide medial summaries; others do not.
- and more.....

How does a lesson plan? Variously, in different ways.

Excellence in planning - a cornerstone of excellence in teaching - assumes many forms but it has common characteristics, no matter how variously presented, no matter how imaginatively clothed. These sample plans, despite their diversity and despite the variety of lesson types, begin by arousing student interest, develop logically, and end with a device to assess student understanding.

This is not an attempt to provide an exhaustive or comprehensive list of every conceivable kind of lesson. Such an attempt would be an exercise in futility, doomed to deserved failure, as readily pin an idea on the wing or capture teacher creativity within the confines of a manual.

When I assumed my present office, I began a dialogue committed to improving our delivery of instructional services. This brochure is part of that dialogue.

Let us continue the dialogue in faculty conferences, at department meetings, professional seminars, everywhere.

How does a lesson plan? Variously, but with a full appreciation of its role in further improving our instructional services.

NQ

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INTRODUCTION

This manual was developed to launch a division-wide dialogue on lesson planning. It is based on the conviction that sound planning is the foundation of sound instruction.

"How Does A Lesson Plan?" seeks to promote the skills and insights to make our classrooms satisfying, purposeful and exciting. Specifically, it

...defines the components of a lesson plan

...identifies the varied types of lessons and notes their significant characteristics

...illustrates these types with sample lesson plans

...identifies those planning elements common to all lessons

...shows the relationship between basic aspects of the plan.

The sample lesson plans which constitute the body of this manual are presented as a guide, not a model for imitation; as a stimulus to experimentation, not an example of the state of the art. They are meant to spark creativity and stimulate a teacher's imagination.

For department heads, these plans will serve as a springboard for improving lesson planning and provide content for study at department conferences. Supervisors will find this manual a valuable tool for staff development.

I am grateful to the following teachers and administrators for their contributions:

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Improved lesson planning is one of the cornerstones of our program to improve our schools.

September, 1981

Nathan Quinones
Executive Director
Division of High Schools

A DEFINITION OF TERMS

Effective classroom instruction requires a well developed, carefully prepared lesson plan for every class period. The lesson plan acts as a roadmap for teaching, helping the teacher to organize the subject matter and direct student activity. It is always prepared in the form of pivotal questions and activities, not in narrative or expository style.

I. Common Characteristics of Lesson Plans

Although there is no single method of teaching, there are common characteristics to all lesson plans. All lesson plans should contain the following elements:

A. Aim
   1. Instructional Objectives or
   2. Performance Objectives

B. Motivation

C. Development or Unfolding of the Lesson - activities and/or questions designed to achieve the aim.

D. Materials of Instruction

E. Summary/Application

F. Assignment

A. Aim

The aim of the lesson describes the teacher's purpose for teaching the topic and provides the primary focus around which the subject matter in the lesson is organized. Determining the aim or objective is the most professional, the most critical part of the planning process.

The aim is most challenging when it is posed as a problem and covers one period of work. It must be clarified for the class early in the period and must be clinched in the summary or application.

1. Instructional Objectives should be considered as complementary to the teacher's aim. I.O.'s are designed by the teacher to describe the expected student behavioral outcomes and serve as criteria to both teacher and student for determining whether the lesson has been successful.

2. At the present time, because the content and development of I.O.'s are in a relatively formative stage, most teachers are concentrating their planning around the active component of I.O.'s - namely, Performance Objectives.

B. Motivation

Motivation may serve many purposes. No motivation, however, is successful unless it serves as a springboard for the lesson by clarifying the aim and by eliciting a number of pivotal points subsumed under the aim. By so doing, the motivation structures the lesson, permitting a logical transition to the content and providing the basis for pivotal questions.

Not every pivotal question can be anticipated; nor is every question pivotal. Only pivotal questions and activities need be included in the lesson plan.

C. Development or Unfolding of the Lesson

This refers to the activities and questions planned by the teacher to help the class achieve the objectives. The teacher arranges the lesson so that the new lesson content is learned in an orderly, sequential and logical fashion.

The sequence is derived from the aim. The aim is identified early in the lesson and is usually stated in the form of a problem. The rest of the lesson is devoted to the development of this aim, i.e., to examining the problem in the aim in logical (or psychological), graded and sequential manner. A lesson so developed is called a developmental lesson.

Teacher lecturing is not an acceptable method of lesson development even when questions are interspersed. It reduces the student to a passive role, discourages participation and inhibits learning.

The development of the lesson requires the most time on task.

D. Materials of Instruction

The teacher organizes and prepares the materials of instruction for the class in advance of the class period and has those teaching aids (text, film, display, demonstration, equipment, supplementary reading materials, etc.) ready for use at the appropriate moment in the period.

Materials of instruction help make learning concrete and provide for a multi-sensory appeal. The use of these materials and aids is noted within the lesson plan in the appropriate section.

Wherever possible, a logical blackboard outline should be developed to reflect the discussion and to provide the basis for students' notes.

E. Summary/Application

The purpose of the summary phase of the lesson is to determine whether the objective has been achieved. Usually the summary reviews from another vantage point the lesson's basic concept, understanding, knowledge or skill.

In the application phase of the lesson, the teacher will ask that the material learned be applied to new situations, thus determining whether the objective has been achieved by evaluating changes in the performance of students.

In this sense, the application phase of the lesson is related to the summary.

F. Assignment

The assignment itself and its presentation to the class are integral parts of a lesson. To ensure success, the teacher should motivate the home assignment, anticipate difficulties students will face, and help students overcome them.

Depending on the nature of the subject and the teacher's objective, the assignment can be used to prepare students for the next class period, serve as a follow-up on what has been learned that day, or provide a means for further learning.

In addition to the class assignment, supplementary, extra credit assignments provide an opportunity to meet individual needs and to challenge students to greater effort.

II. Variety of Method

Teachers should develop a variety of approaches to the daily class period. Each type of lesson requires a unique use of time, materials, and methodology. Regardless of the lesson type, a lesson plan with all of the common characteristics is required.

Characteristics of Lessons

The chart on the following pages presents in simplified, outline form the characteristics of the major methods and inherent cautions to be considered.

Lesson Type	Characteristics	Cautions
1. Supervised Study	1. Most frequently used at the beginning of the term to help pupils perform homework assignments successfully, answer questions, take notes, keep notebooks in proper condition	1. To be used occasionally for brief periods of time and for specific, readily identifiable purposes
	2. Useful in teaching skills: a. reading for meaning, detail, relationships, inference, author's point of view, analysis, etc. b. map, globe, graph, chart skills c. arrangement and care of notebook d. use of textbook for table of contents, index, chapter headings, bibliography e. library skills	2. Can become busy work 3. Must not be used in lieu of homework 4. Before assigning the work to be done in class, determine a. whether the work can be at home b. whether active guidance and help of the teacher is required in class
	3. Used during term only as need arises, e.g., before tests	
	4. To be incorporated in lessons for brief periods as need arises	
	5. Motivation in terms of recognizable student weakness required	
	6. Active planning by teacher required	

Lesson Type	Characteristics	Cautions
2. Using Audio-Visual Aids	1. Makes learning concrete	1. False underlying assumption: that a lesson plan with a clearly delineated aim and structure not needed
	2. Provides multi-sensory appeal	
	3. Adds interest and variety	2. Many frames irrelevant, repetitious and unrelated to aim
	4. Full period or part of period	3. Pupil passivity encouraged
	5. Most effective after motivation and aim are established	4. A-V to be previewed by teacher; selection of only those frames appropriate to aim
	6. Reason for viewing or listening to A-V aid to be stated as a question to be answered	5. Must be educational, not entertainment
	7. The frames discussed in relationship to the aim	6. N.B.: A-V aid is in itself not motivational nor does it direct the learning process without careful teacher planning.
	8. A-V aids incorporated into a lesson plan	
	9. Definition of difficult words in advance of viewing required	
3. Developmental Lesson	1. Logical, sequential development of a problem aim containing a concept	1. Used excessively because of the value of increased socialization
	2. Careful gradation from the particular to the generalization (concept) required	2. Difficult to master; requires incisive logic
	3. Guiding students from the known to the unknown, from the simple to the complex, culminating in the development of a concept or generalization	3. May lead to purposeless "rapping"

Lesson Type	Characteristics	Cautions
3. Developmental Lesson (cont.)	4. Lends itself to best control of time and to most extensive pupil participation in sustained discussion	
	5. All aspects of basic lesson format clear	
4. Dramatization	1. Use of students to dramatize a problem, conflict, character, or theme	1. Time factor to be watched carefully
	2. Useful in a variety of ways: to motivate, to summarize, or to develop a lesson's objective	2. A mature and well controlled class required
	3. Significant opportunity for creative expression	3. Fosters illusion that, because student participation is increased, the dramatization is educative
	4. Students allowed to become participants rather than spectators	4. Careful planning required for dramatization
	5. Provides vivid experience	
5. Reporting Lesson	1. Useful as enrichment to a lesson and as supplement to textbook	1. Reporting in lecture form inappropriate for high school students
	2. Useful as a class assignment for individual students	2. Poor writing and delivery of reports
		3. Guidelines required as to topic, format, research, length, presentation

Lesson Type	Characteristics	Cautions
5. Reporting Lesson (cont.)	3. Presentation of material that is not readily available 4. Students trained in organization and communication skills 5. Provision for individualization 6. Useful in training class in group processes as well as interaction skills	5. Need to choose topics carefully to ensure availability of research materials 6. At best, sparing use indicated for short periods 7. Guide questions needed by class 8. Use of chalkboard to summarize research conclusions needed 9. Summary questions needed to clinch main ideas of report
6. Debate/Panel Forum	1. Opportunity provided to student chairman for leadership and to student participants for extended presentation of views 2. Provision is made for board work, medial and final summaries and audience participation 3. Controversial issue presented 4. Provision for purposeful research 5. Variety provided in an exciting instructional mode	1. Monitoring of time needed to make certain that speakers do not monopolize discussion 2. Careful training of student participants needed 3. Teacher assistance to student chairmen with clinching questions to make certain of outcomes 4. Need for much extra teacher time 5. Clear outcomes and a chalkboard outline of views, new vocabulary, etc., needed

Lesson Type	Characteristics	Cautions
6. Debate/Panel Forum (cont.)		6. N.B.: Panel forum is preferable to debate since it does not bind a student to a viewpoint and enables him to modify his views more readily. The debate is more competitive and, in competition, students' egos are associated with the viewpoints expressed in the debate, inhibiting the appreciation of other viewpoints.
7. Hands-on Experience	1. Provides a direct, real learning experience	1. Attention to safety features needed
	2. Use of equipment and materials	2. Teacher demonstration alone insufficient to insure attention
	3. Active involvement of pupils	3. Active supervision required for hands-on experience
8. Inquiry	1. Problem solving, inductive approach using real or simulated materials	1. Time consuming and completion of course of study may be impeded
	2. Attempt to replicate or simulate the scientific process of inquiry and discovery	2. Difficult to evolve an aim
	3. Experience of discovery exciting	
	4. Critical and scientific thinking promoted	
	5. Independent learning promoted	

Lesson Type	Characteristics	Cautions
9. Review A. for a test	1. Teaching test taking techniques: a. allocation of time b. interpretation of what the question requires c. defining key terms, e.g., compare, show relationships, list, state, describe d. analysis of particular types of short answer questions, e.g., multiple choice, graphs, maps, matching questions, time lines	1. Review of short answer questions to be avoided; short answer questions to be analyzed mainly for methods attacking them 2. Factual details to be reviewed in context of essay questions or major problems so that facts are reviewed in relation to concepts 3. Use of the board to have students write answers for class to analyze
	2. Examination of previous learnings from new perspectives	4. For conservation of instructional time, burden for study and review to be placed on student
	3. Need to teach how to follow directions	6. Analysis of major student weaknesses needed for reteaching
	4. Need to teach how to study	
B. after a test	1. Review lessons are productive only if: a. an item analysis is made b. the major common errors highlighted by item analysis form the subject matter for instruction	1. Reteaching of subject matter using the same methods and materials unproductive
	2. Student to be helped with individual errors	
	3. For review of essay questions the best answer(s) to be placed on chalkboard	
10. Skills	1. Acquisition of skills through drill and practice emphasized	1. Cyclical assignments needed
	2. Drill essential in typing, music, stenography, etc.	2. Motivation required for drill 3. Need for varied methods to avoid boredom, e.g., warm-up, timed drill for review, new lesson drills, summary, application, etc.

Lesson Type	Characteristics	Cautions
11. Library	1. Incorporates use of the library as a resource for further study and learning 2. Essential skill for further study 3. Students aided in enjoying use of this cultural resource	1. Need to provide motivated, hands-on experience 2. Library skills to be taught as need arises
12. Class Trips	1. Utilizes community and other resources to enrich textbook knowledge 2. Experience broadened 3. Classroom learnings applied 4. Relevance of textbook knowledge increased	1. Planning needed to minimize loss of instructional time in other areas 2. Guide and question sheets to be prepared with each trip 3. Arrangements to be made in advance to interview people, where appropriate 4. Need to determine whether this use of teacher time is economical 5. Need to determine whether trip is essential to achieve objectives; would slides, filmstrips, or speaker serve as adequate substitute?

Sample Lesson Plans

The following section presents a number of plans to illustrate the variety of lesson types available to teachers. They are intended to serve as samples, not to impose a rigid and procrustean format.

Supervised Study

AIM: Why is East Asia important as a culture region?

I.O.: 1. Student will be able to find the answers to the homework by efficient use of their textbooks.

2. Students will be able to explain how to find material in the text; how to distinguish among table of contents, index, and glossary; and how to read a map.

Development

1. **Motivation:**

   a. The number of airplanes going to East Asia increased ten times in the past 20 years. Why?
   b. The homework questions may help in answering the above question.

2. **Homework:** Overview of East Asia

   a. Why has it been said that the Western World was enriched by the gifts it received from East Asia?
   b. China has a large population, yet the U.S. carries on a small trade with it. Why?
   c. East Asia contains many "trouble spots" of global concern. Explain.

3. a. How would you locate the answers to the questions?

   b. What are the differences among table of contents, index, and glossary? To which would you turn for the Chinese compass? Why?

   c. In looking at the gifts of East Asia to the world, you notice big black typed headings. What does the varied type tell you? Which type leads you to the gifts of Asia? to the "trouble spots" in East Asia?

4. In planning trips to East Asia, Americans consult maps. What can they learn by reading maps?

Content

A. Text

1. Table of contents useful for chapter headings, etc.
2. Index - alphabetical listing of material in book
3. Glossary - definition of words
4. Map
   a. meaning of color differences
   b. legend
5. Graph
   a. significance of numbers
   b. significance of lines
   c. significance of bars

B. Gifts of East Asia

1. compass
2. gunpowder
3. printing paper maker
4. ceramics
5. iron casting

C. Trade
   1. resources: oil, coal, chromite, antimony, tungsten
   2. One billion people in China as potential market

D. Trouble Spots: Taiwan, Vietnam, Sakhalin

Application: Using the text aids, what information about East Asia can you find quickly?

Using Audio-Visual Aids

AIM: What were the causes of the Spanish American War?

I.O.: Students will be able to explain the fundamental causes of the Spanish American War.

Development

1. Motivation: Last night you read the section of your texbook explaining the causes of the Spanish American War. If you were making a film strip of the causes of the war, what frames would you include?
   Now we will see a film strip. Watch it carefully so that you will be able to discuss the similarities and differences between your suggested frames and the film loop describing the causes of the war. [Students view a short (8 min.) film loop, "The Spanish American War".]

2. The text made clear that the Spanish American War was caused by M's - money, Maine, military defense, men, Manifest Destiny.

   a. Explain each view.
   b. Do you agree or disagree? Why?

3. Which of these received the most vivid treatment in the film loop? Cite evidence.

4. Could reasonable men have avoided the war? Why?

Content

Causes of the Spanish-American War:

1. money - capitalist investment in sugar railroads

2. men - Pulitzer, Hearst
   - yellow journalism and jingoism
   - concentration camps for Cuban rebels
   - DeLome letter

3. Manifest Destiny - Mahan and T. Roosevelt

4. Military defense os U.S. - Cuban bases

5. "Remember the Maine"

Summary:

1. In studying 19th century European imperialism and war, you studied the fundamental causes for these developments. To what extent are the fundamental causes of the Spanish American War similar? different?

2. If you were a speech writer for Senator Beveridge, how would you justify the war in a Senate speech?

3. If you were a member of the Anti-Imperialist League and were preparing a leaflet for distribution, what would you write?

Developmental Lesson

AIM: How did unicellular organisms evolve into multicellular organisms?

I.O.: Students will be able to

1. define the following terms: multicellular, unicellular, specialization, colony, organism
2. explain how unicellular organisms evolved into multicellular organisms.

Development	Content
1. Motivation: Experts say that all life began as single cells in the ocean. We know that life is now multicellular and is found on land, in the water and in the air. a. What questions would you ask the experts? b. What answers would the experts give you?	1. Living things were limited to small size until they evolved into many-celled organisms.
2. Show a four minute film loop, "Life in a Fresh Water Pond".	2. Unicellular organisms evolved into multicellular organisms by first forming colonies. A colony consists of several hundred cells which remain together after cell division.
3. How did life evolve to multicellular forms?	3. The cells of multicellular organisms undergo specialization. They work together on a specific task and lose their independence.
4. What evidence can experts provide to substantiate their statement?	4. The level of specialization of the individual cells in a colony is not as great as is the level of specialization of cells in a more complex organization.
5. Look at a fossil chart. Compare the fossils in the early period with those in the later period.	5. Multicellular organisms are highly specialized.
6. Look at the picture of a colony of cells and a single cell organism. What are the advantages of a colony of cells as opposed to single cells?	
7. Look at a chart showing the different cells in the human body. a. What are the differences among the cells? b. Suggest hypotheses that would explain how an organism evolved from colonies.	

Summary:

1. In what ways is a multicellular organism better adapted than the unicellular organism to carry out its life functions?

2. How would a Darwinian explain this phenomenon?

Developmental Lesson

AIM: How can we determine the power output of a machine?

I.O: 1. Students will be able to distinguish between a quantity of work (measured in joules) and a rate of performing work (measured in watts).

2. Students will be able to solve problems requiring the use of the equation:

$$\text{Power} = \frac{\text{Work}}{\text{Time}} \quad \text{or} \quad P = \frac{W}{T}$$

Development	Content
1. Motivation: Have two students of approximately equal weight run up a flight of stairs. Record each student's time. a. Who has done more work? b. How would you descibe the difference between the performance of the two students?	1. Power is the rate of doing work. 2. Work is the force applied through distance. $P = \frac{W}{T}$
2. With two identical hand electric generators, have two students rotate the handles ten times. Which student has done more work?	
3. Have two students "race" to turn the handles ten times. How does the appearance of the light bulb indicate which student was the winner?	
4. What is the mathematical relationship between the time required to perform a particular amount of work and the power resulting from this work?	
5. Demonstration: Have a student pull a block of wood across a table by means of a rope and a spring balance calibrated in newtons. Be sure the pull is horizontal and the motion at constant speed. Explain what you observed with respect to a. force used b. time taken c. distance moved d. power developed	

Development

6. If the force required to turn the handle of a generator is 16nt and the circumference of the turn is .34m, what power is developed by the generator if the handle is rotated in .1 second?

7. Summary: Calculate the amount of work done in pushing a 2000nt car up a 10m hill (change in elevation = 10m). What power is needed to complete the above task in five minutes?

   a. What is the definition of work? of velocity?
   b. Write an alternate form of the equation for power.

Applications:

1. Have students solve several problems using the above equations.

2. What do advertisements mean when they say that an automobile is "powerful"?

Developmental Lesson

AIM: What were the causes of the Age of Exploration, 1450-1620?

I.O.: As a result of the discussion, students will be able to
1. identify and explain four causes for the Age of Exploration, 1450-1620;
2. indicate on map the areas explorers claimed.

Development	Content
1. Motivation: Someone summarized the reasons for the Age of Exploration as "Gold, Glory and God." Another historian said that the gifts of the new thinkers of the Renaissance must be added as a fourth factor. Tell why your agree or disagree with these views.	1. Gold - or economic gain a. Portugal and later Spain interested in gold, spices, slaves from Africa and Asia. b. fortified trading posts c. need for new trade routes because of Venetian-Arab control of Mediterranean Sea
2. Explain each of the factors cited.	2. God - desire to spread Christianity
3. When DaGama reached India he said, "We came in search of Christians and spices." Explain.	3. Glory - spirit of new adventure spurred by individualistic Renaissance spirit
4. Point to the map showing areas each of the explorers discovered.	Columbus - New World DaGama - Cape Horn Cabral - Brazil Balboa - Pacific Magellan - sailed around the world Hudson, French and Dutch in North America
5. The English dubbed Prince Henry of Portugal as "Prince Henry, the Navigator," arguing that his work was largely responsible for the Age of Exploration. What evidence can you provide for this statement?	4. Gifts of science - compass, astrolabe, cannon, new maps, astronomy.
6. It is said that the same spirit that moved the astronauts moved the explorers. Do you agree? Why?	

Summary:

1. Which of these do you regard as the most important factors in the Age of Exploration? Why?

2. Is there a contradiction in seeking both slaves and converts to Christianity in the same place? Why?

3. "The Age of Exploration was one of the most exciting periods in man's history." Explain.

4. During the 1970's the Space Age inaugurated a new Age of Exploration. Do you think discoveries in space will rival the discoveries made during the 15th and 16th centuries?

Developmental Lesson-Values Clarification

AIM: What is more important - material well-being or democratic values?

I.O.: 1. Students will be able to identify their values orally.
2. Students will be able to defend their values with at least one reason.

Development

1. Motivation: A wealthy man offers a small town college $500,000,000 to be used for expansion on condition that Eskimos not ever be allowed to attend the school. The agreement may not be abrogated and must be confirmed at a town meeting of voters and college trustees. This class is the town hall meeting. Would you accept or reject the money? Why?

2. Justify your vote.

3. What values underlie your reasoning?

4. Which are more important - democratic or material values? Why?

5. Medial Summary: How many of you changed your views as a result of the discussion? Why?

6. I forgot to tell you that the wealthy man also added another group. He also banned (select the group in the class - Jews, Blacks, Irish, Hispanics). How would this affect your views?

Content

1. Reasons for acceptance

   a. great material wealth - rise in land values, opportunity for employment on unskilled, skilled, professional level
   b. Great cultural development of region
   c. growth of cosmopolitan enlightened environment
   d. Eskimos a minute group and almost none attend the school; can go elsewhere.

2. Reasons for rejection

   a. racism
   b. undemocratic attitude
   c. spiritual values more important than material ones

Summary:

1. How many changed your vote? Why?
2. Which values now strike you as most important?

Developmental Lesson

AIM: How to solve quadratic equations graphically

I.O.: Students, presented with equation of the form $K = ax^2 + bx + c$, will

1. be able to find the roots graphically;
2. be able to state the nature of the equation graphically.

Development:

1. $0 = x^2 + 3x + 2$
   Find the roots of the equation algebraically.

2. Find the roots of these equations:

   a. $2 = x^2 + 3x + 2$
   b. $6 = x^2 + 3x + 2$

3. What elements do these equations have in common?

4. How does the general equation of the parabola differ from these questions?

5. What type of graph do you get if you graph an equation of the type $y = k$?

6. Graph $y = x^2 + 3x + 2$. Can this graph be used to solve the questions in 1 and 2?

7. How do we solve a system of two equations algebraically?

8. Find the roots of 1 and 2 graphically.

9. Classify the roots in each of the equations in 1 and 2.

Summary: Which method is quicker, algebraic or graphic, for determining the nature of the roots of a quadratic equation?

Application: $4 = x^2 - 6x + 5$
Find the roots and the nature of the roots graphically

From the graph of $K = x^2 - 6x + 5$ determine the nature of the roots if $K = 5, 17, 0, -3, -\frac{1}{2}$.

Extra Credit:

1. Determine the value of K which makes the roots equal.
2. What is the least integral value of K for which the roots are real?
3. What is the maximum value for K for which the roots are imaginary?

Developmental Lesson

AIM: How can I describe a character to help a reader visualize him?

I.O.: Students will be able to demonstrate how words can convey the dominant impression of a character by writing the first paragraph of a descriptive composition.

Material: Textbook - Hardy, Thomas, The Return of the Native, First edition, New York: Cambridge Book Company, 1968.

Thirty-five pictures in which the dominant mood of the subject is conveyed.

Previous Assignment:

1. Read the description of Eustacia Vye (pp. 72-74) carefully.
2. Describe her features, i.e., eyes, mouth.
3. Explain the allusions: Artemis, Athena, Hera.

Development

1. Motivation: Distribute pictures, one to each student. What is the dominant impression that the picture conveys? How does a photographer or painter use details to create that impression?

2. Let us now look at a portrait in words - the description of Eustacia Vye in The Return of the Native. Turn to page 72.

    a. Describe Eustacia's outer appearance.
    b. How is her inner character revealed through this physical description?
    c. Why does Hardy compare Eustacia to the goddesses Artemis, Athena, Hera?
    d. What is the dominant character trait that Hardy tries to convey? Select one sentence to support your opinion.

Summary:

1. What three methods does Hardy use to make a vivid impression?
2. Look again at the pictures distributed earlier in the period. State the dominant mood in one sentence. Describe the subject of the portrait to convey this mood. Read your description aloud.
3. Which description did you like best? Why?

Assignment:

Choose a person you know well for description. Decide on the dominant impression that you want to convey. In a well-organized composition (250-300 words) describe this person. Be sure that the outer appearance reflects the inner personality.

Dramatization

AIM: How can I make a good impression at a job interview?

I.O.: In role playing, student can conduct himself in accordance with rules for job interview.

Previous Assignment: Read pp. 150-152 in Linder, Bertram, Economics for Young Adults. What suggestions does the author give to a person going to a job interview?

Cut five want ads from The New York Times or the Daily News that would interest you.

Development:

1. Motivation: Teacher reads a Help Wanted ad inviting applicants to come for an interview.

   a. The teacher role plays a person who performs poorly during a job interview. The teacher will slouch, chew gum, whistle, mumble, shout.
   b. When teacher finishes, a student role plays an interview in a more appropriate manner.

2. To whom would you give the job - the student or teacher? Why?

3. Using the homework assignment in the Linder textbook and the interviews you have seen, what advice would you give to a job applicant to make a better impression?

4. Explain and illustrate.

5. Which rule is the most important? Why?

6. Think of a friend who may soon apply for a job. What advice would you give him?

Content

1. Dress neatly and carry a book or newspaper.
2. Be polite (e.g., remove hat, wait for invitation to be seated.)
3. Don't chew gum.
4. Sit up straight and appear alert.
5. Speak in complete thoughts, using good English and avoiding slang.
6. Ask questions concerning promotion and responsibilities.
7. Tell the truth.

Application:

1. How would you apply the rules to the ads you selected from The New York Times and the Daily News?

2. Role play another interview applying for a job. To what extent has he applied the rules?

Dramatization

AIM: What were the circumstances surrounding the death of Eustacia Vye?

I.O.: Having read *The Return of the Native*, Books I-V, the student will state the cause of Eustacia's death and prove his answer through direct references to the novel.

Previous Assignment:

1. Complete Book V.
2. Extra Credit: Pretend you are _____. Be prepared to retell in the first person the events that occurred on the night of November 6. (Assign characters' parts to individual students.)

Development:

1. Motivation: Many of you probably watch Quincy on TV. By the end of the program, what does Quincy try to determine?

   We are going to serve as a coroner's jury to determine the cause of Eustacia's death.

2. Skim to refresh your memories.

3. Foreman, call each witness.

Witness	Anticipated Questions	Content
Johnny Nunsuch	What did you see at the Yeobright house on the day old Mrs. Yeobright died?	
	What did Mrs. Yeobright say to you?	Events leading up to the the death of Eustacia
	What part of this story did you tell Mr. Yeobright?	Possible evidence of suicide
Charley	In what way was Eustacia's behavior unusual?	
	Why did you hide the pistol in Captain Vye's stable?	Role of pistol
	What did Eustacia say when you told her you had locked up the pistols?	

Witness	Anticipated Questions	Content
Clym Yeobright	What was your impression of Johnny's story? What was the reaction of your wife when you confronted her with this story? Why did you write her a letter? Please read the letter, Mr. Yeobright.	Conflict between Clym and Eustacia
Susan Nunsuch	Did you see Eustacia on the night of November 6? What was she doing?	Hatred and fear of Eustacia (foul play?)
	What were you doing? Why?	
Captain Vye	What did you do with the letter from Clym? When did you first notice that Eustacia was missing?	The break between Clym and Eustacia
Diggory Venn	What did you hear on the night of November 6?	
	When you questioned Thomasin, what did you discover?	The crying woman was not Thomasin.
Thomasin	Tell us about your movements on the night of November 6.	The establishment of Wildeve's movements
	Why did you go out on such a night?	

3. Medial Summary: What events led to Eustacia's death?

4. Call back Clym and the reddleman.

Clym	To the best of your recollection, what did you hear at Shadwater Weir?	The facts about the drowning
	What action did you take?	
Diggory	What did you do at Shadwater Weir?	

Summary:

1. If we had a witness who overheard Eustacia's thoughts ("Can't I go...?"), what conclusion would he have drawn?

2. What evidence did we hear to support the view that the cause of death was an accident? suicide? Support you opinions by concrete evidence from the inquest and the text.

Assignment:

In a paragraph of 100 words, state whether Eustacia's death was a suicide or an accident. Prove your answer through specific references to the novel.

Reporting Lesson

AIM: What were the causes of the Civil War?

I.O.: Students will be able to make a report (oral or written) describing and interpreting the results of their research and develop a blackboard outline as a summary.

Development

1. Motivation:

   a. According to your committee research, what were the major causes of the Civil War?
   b. Support your point of view.
   c. Give examples.

2. Quote facts and figures to support your statements.

   a. Use charts and diagrams to support your views.
   b. What primary sources support your views?
   c. Prepare a blackboard outline of your major points.

Content

Class is divided into committees which will do research and report on the following topics:

The Northern Viewpoint
The Southern Viewpoint
The Western Viewpoint
The Historian's Viewpoint
The Immediate Causes of the Civil War
Major Personalities of the North; of the South
European Viewpoint

Summary:

With these different perspectives, could the American Civil War have been avoided?

Assignment:

A famous American author has written a book about the Civil War called The Irrepressible Conflict. Using the research you have done and the blackboard outlines of each committee, write a paragraph stating your view on whether the war was indeed irrepressible.

Debate

AIM: Should the U.S. deport former Nazis?

I.O.: Through participation in debate, during which opposing viewpoints will be presented and defended, students will express in writing at least three clear reasons to defend their opinion.

Development

1. Motivation: It has become public knowledge in recent years that several Nazis are living in the U.S. Many of these people have been good citizens and workers in our country. Some are accused of murder and other crimes committed during World War II and have falsified information about their past to gain entry to the U.S. Most have become citizens on the basis of false information. The U.S. Department of Justice is now moving to prosecute and deport these Nazis. While many Americans have expressed agreement with the actions of the Department of Justice, others have disagreed, claiming that since these people have been good citizens of the U.S. it would be vindictive for us not to allow them to live out their old age in peace. Should these people be allowed to retain their citizenship?

2. Procedure:

   a. Using volunteers, pro and con debate teams of three students each are chosen.
   b. A student-moderator is selected who will ensure equal speaking time (2 minutes) for each team member. A student recorder lists on the chalkboard the major pro and con points raised by each team.
   c. With which point of view do you agree? Why?
   d. During the course of the debate, it is expected that the following concepts will be stated and placed on the chalkboard:

Content

SHOULD THE U.S. DEPORT FORMER NAZIS?

YES	NO
1. Nazis who violated U.S. law should be prosecuted as are any other criminals.	1. None of the Nazis living in the U.S. has committed any crimes against Americans.
2. Through deportation to their countries of origin, the Nazis can be made to account for murders and other crimes committed during the Holocaust.	2. Some Nazis have been exemplary citizens, participating actively in labor unions and civic affairs.
3. The prosecution of Nazi war criminals will continue the education on the horrors of genocide.	3. As the U.S. is filled with illegal immigrants from many nations and of many political persuasions, Nazis who are singled out for official prosecution are suffering discrimination.

YES	NO
4. The prosecution of Nazi war criminals will act as a brake on the growth of neo-Nazi movements in the U.S.A. and in other nations.	4. Even among Jews and other victims of the Holocaust there are many who would prefer not to keep alive painful memories through public trials and media coverage.
5. Although many Nazis were not prosecuted for many years because they were regarded as anti-Communists, there is little difference between Nazism and Communism as totalitarian systems of government.	5. Many Nazis were admitted to the U.S. because of the Cold War fear of Communism. They should not now be victimized because of recent changes in government attitudes.

e. Each debate team makes a final summation of viewpoints.

f. Student-moderator invites class to question debators or make brief statements.

Summary:

1. Match the arguments on the board so that each statement made on one side is challenged on the other.

2. In your opinion, which argument is best? Why?

3. How many have changed your vote as a result of this debate? Why?

4. Write a paragraph of 150-200 words to state and defend your views.

Hands-On Experience

AIM: How can we bleed brakes?

I.O.:
1. To identify three reasons why brakes have to be bled
2. To check, determine and locate bleed points
3. To bleed in the proper order
4. To do a final safety check of the brake system

Materials:
1. wheel cylinder
2. backing plate
3. wrenches
4. ax
5. copper tubing
6. screw driver

Development

1. **Motivation**: I have just completed a brake job. When I take the car out for a test ride, I find that the brakes don't work and that the only way to stop the car is to ram it into a garbage truck!

   a. What could be the problem?
   b. How does air get into the braking system?
   c. Why does air prevent the operation of the brakes?
   d. What must be done in order to remove the air from the front lines?

2. **Demonstration**:

   How would you proceed to bleed the brakes?

   a. Why is it necessary to bleed the wheel cylinder farthest from the master cylinder first?
   b. Why can't we put any type of liquid in the master cylinder?
   c. If we opened the screw, the air would not come out. How can we force the air out?
   d. What is the connection between the bleeder screw and the brake pedal?
   e. Why does one turn of the bleeder screw work best?

3. **Student Demonstration**.

   a. What did he do particularly well?
   b. Any mistakes?

Procedure for Bleeding Brakes

1. Air gets into the lines whenever the master cylinder is empty, lines are disconnected or wheel cylinders are rebuilt or installed.
2. Check the fluid level in the master cylinder.
3. Locate the bleeder screw.
4. Bleed the wheel cylinder farthest from the master cylinder first.
5. Have someone pump the brake pedal and hold it down.
6. Open the bleeder screw one (1) turn.
7. Close the bleeder screw or air will be drawn in when the brake pedal is released.
8. Fill the master cylinder after each wheel cylinder has been bled.

Summary:

List the steps for bleeding brakes on the blackboard.

Safety:

1. Eye safety
2. Keep brake fluid away from painted surfaces.

Hands-On Experience

AIM: How can we make a single flare on aluminum tubing?

I.O.: Given aluminum alloy tubing, tools and manuals, students will be able to make a single flare, following standard safety and tradework procedures according to FAA specifications.

Materials:

- flaring tool
- tube cutter
- sample of tubing
- pieces of tubing for practice
- Go, no-go gauge
- plastic mallet
- samples of connections
- visual aid of flare in holder
- pieces of flared tubing

Development

1. Motivation: How can we secure this section of tubing to the fitting to avoid leaking?

2. Demonstration

   a. Describe what you saw.
   b. Which step is most important?

3. Why is a proper projection important?

4. How do you use the hammer to shape the flare properly?

5. Why is cleanliness important?

6. How do you test the flare connection?

Content

Demonstration of making a single flare

a. Place nut and sleeve in place
b. Clamp tube in holder.
c. Form flare.
d. Remove flare and clean.

Application:

1. Have another student volunteer to perform the task. Evaluate the strengths and weaknesses of this performance.

2. Distribute materials to students. Each student makes a single flare. (cf. AC 65 - 9A, pp. 111-112, General Handbook.)

Assignment:

1. Read the procedure to make a double flare (AC 65 - 9A, pp. 112-113 and repair of metal lines, pp. 113-114).

2. Describe the differences between a single and double flar

Inquiry Lesson

AIM: Who has a "real" chance to become President?

I.O.: Students will be able to list and explain the importance of the factors that affect Presidential electability, including constitutional requirements and hidden factors.

Materials: Mehlinger, Howard D. and Patrick, John J., American Political Behavior: Book II

Development

1. Motivation Imagine that you are on an advisory group to the Democratic or Republican National Election Committee. The Committee is charged with finding out which type of person is most "electable as President." The chairman opens the conference by saying that the hidden factors are more important than the constitutional do you agree or disagree? Why?

2. Examine the chart from American Political Behavior for the hidden factors. What conclusions can be drawn?

3. What background characteristics would militate against a person's selection?

Content

1. Constitutional requirements - Article II
   a. Natural born citizen
   b. 35 years of age within the U.S.
   c. 14 years of residency within the U.S.

2. Hidden factors
   a. populous states with large electoral votes
   b. over 50
   c. western European ancestry
   d. religion
   e. well-to-do family
   f. educated in good school
   g. prestigious and well paid occupation
   h. significant previous political experience
   i. sex
   j. ethnicity

Summary:

1. Which of these factors is the most significant asset? The greatest handicap?
2. What do you think your chances of election as President will be when you are 50? Explain.
3. To what extent did Reagan meet these requirements?
4. What would you have to do to make yourself more eligible (electable)?

Inquiry Lesson

AIM: How can we identify carbohydrates?

I.O.: Given eight formulas, a student will be able to differentiate between inorganic and organic compounds and identify which of the organic compounds are carbohydrates.

Materials: Bunsen burner, test tubes, test tube holder, dextrose (glucose), sucrose, starch, wooden splints, NaCl, H_2O, starch, overhead projector, transparencies

Development

1. Motivation: Your doctor tells you that you must not eat organic compounds called carbohydrates. What would you ask you doctor?

2. Here are two compounds, one organic and one inorganic. What would a scientist be interested in determining?

3. Let's see what happens when we heat them.

   a. What did you observe?
   b. Record your observations.

4. Using your observations, formulate a hypothesis concerning the chemical elements present in the organic compound: H_2O + C = hydrogen, oxygen, carbon.

5. How can we test our hypothesis?

6. Let's heat some starch in a test tube. Record your observations and your conclusion.

7. Define an organic compound.

Summary:

1. Let's see if our definition is accurate, Read definition in textbook: Weinberg, Biology: An inquiry into the Nature of Life, p. 39, section 3-8, paragraphs 1-3.

2. How do you know NaCl is an inorganic compound?

3. Write the following compounds:
   NaCl, H_2O, CH_4, C_6H_{12}, O_6, NH_2, CH_2, HCOOH, Na_2CO_3.

4. Study this transparency. Note the structural formulas of glucose and a characteristic lipid.

   a. How are these compounds alike?
   b. How are they different?

5. Write a rule for determining whether a given compound is a carbohydrate. Why are sugars and starches carbohydrates?

Assignment: Weinberg, Biology: An Inquiry into the Nature of Life

1. Read pp. 42-43 top.
2. Page 46, Q. 3, Group A
3. Given the following list of formulas, indicate whether each compound is an organic or inorganic compound. For each organic compound indicate whether of not it is a carbohydrate.

$C_4H_8O_4$	$(C_6H_{10}O_5)100$
$CaSO_4$	NaOH
$ZnCl_2$	$C_{12}H_{22}O_{11}$
CH_2NH_2COOH	$C_{18}H_{32}O_{16}$
$C_4H_8O_2$	$Ca_3(O_4)_2$

Inquiry Lesson-Laboratory Report

AIM: Is Newton's First Law of Motion valid?

I.O.: 1. Students will be able to define Newton's First Law of Motion.
2. Students will be able to cite several commonplace examples of Newton's First Law.

Development

1. Motivation: Explain each of these experiments:

   a. Fill a glass with water and place it on a sheet of paper. Pull paper quickly from under the glass of water so that the glass remains stationary.
   b. Rockets going into space start with engines but once they leave the earth's atmosphere the engines are shut off and the rockets continue their flight. Explain.
   c. Tie a piece of chalk loosely to a string and swing around until chalk is loosened and spins off on a tangent.

2. What hypothesis might explain each?

3. Let us test the hypothesis.

   a. Place a smooth card on a glass and a coin on the card. Flip the card rapidly so that coin falls into the glass.
   b. In which direction does a car go when it skids?
   c. Passengers lurch in the direction the train is moving when it stops suddenly. Explain each.

4. When the engines of the rocket are turned off it continues into space. A bicycle going down the street will ultimately come to a halt. Why?

5. There is an old vaudeville act in which a waiter pulls a table cloth from the table without upsetting the dishes. Why is this more difficult to do than to flip a card from under a coin?

Content

Newton's First Law

1. Things at rest tend to remain at rest.

2. Things in motion continue in motion in a straight line.

3. Friction and other outside forces will stop moving objects.

Summary:

1. Using these laws of motion, explain why

   a. people should use seat belts.
   b. head rests are important on automobile seats.

2. What other evidence can you find for these laws of motion?

Assignment:

Write a lab report on the above experiments, including apparatus, diagrams, procedures, observations and conclusions.

Inquiry Lesson-Demonstration

AIM: How do concentration and temperature affect the rate of chemical reactions?

I.O.: Students will be able to predict how changes in concentration or temperature will affect the rate of chemical reaction.

Materials: Large clock, hot plate, 6 stirring rods, 6 -250 ml beakers, 6 -50 ml graduates, 2 -600 ml beakers (1 with ice and 1 with water at room temperature), solution A (20g $NaHSO_3$ & 2 g $Na_2S_2O_3$), solution B (90 ml HCHO & 10 ml phenolphathalein/liter)

Development

1. Motivation: Demonstrate the formaldehyde clock reaction, using 50 ml solution A & 50 ml B in a beaker.

   a. When will the colorless solution in the beaker suddenly develop a deep reddish color?
   b. How was I able to predict the color change so accurately?
   c. What factors would have to be considered if we wished to repeat the reaction in the same amount of time?

2. Design an experiment that will illustrate the effect of concentration on chemical reaction time.

3. On the basis of your observations, what effect does varying the concentration of reactants have on the rate of reaction?

4. For effect of temperature proceed as above.

Application:

1. In what way does the collision theory explain the effects of concentration and temperature on the rate of reaction?

2. Why should food be refrigerated?

3. How does a pressure cooker cause foods to be cooked faster?

4. What are the chemical and health implications of a sanitation strike in the summertime?

Supplementary Reading: Article on high speed reactions in the flame of a burner

Assignment:

Kavanaugh & Robbins - Concepts in Modern Chemistry, read pp. 282-283

Answer questions 2-10 on page 289.

Review Lesson for a Test

(N.B. The techniques outlined below are presented as suggestions for organizing a lesson which reviews for a test).

AIM: What problems will I face with different types of test questions?

I.O.: After studying test questions, students will be able to approach and attack different types of questions.

GUIDING PRINCIPLES TO REVIEW LESSONS FOR UNIT, MIDTERM OR REGENTS TEST

A. Most review lessons that merely re-teach content previously studied from the same perspective, without change in methodology or materials, are unproductive.

B. Most reviews for a test are based on questionable assumptions: that they must substitute for home study because students will not prepare by themselves; and that all content covered must receive equal attention in class.

C. To be productive, review lessons must emerge from the perceived needs of the class.

D. A review lesson should be organized around similar topics, not based on a large number of disparate elements. The lesson should focus attention on two or three misunderstandings which, if possible, are interrelated and fused into a unified lesson. Under such conditions teaching unfolds logically and sequentially.

E. Review lessons should train students in test-taking techniques:

interpreting questions	apportioning time
following directions	recognizing types of questions
locating key words	learning how to study and prepare for tests

Motivation: Distribute a previous exam.

A. Multiple Choice Questions

1. Call on students to read and answer selected, sample questions. Student should be asked to explain reason for answer and reasons for eliminating distractors.
2. If distracting choices (foils) are good sources of the material to be covered, ask:
   - Why is choice x not the right answer?
   - What must you know to eliminate choice y?
   - How do you know choice w is incorrect?
   - What words in a particular question help students find the correct answer?
3. Same process for matching questions
4. Similar process for T-F questions

B. Diagram Questions

1. Ask questions which focus on information given.
2. Pinpoint problem areas.
3. Train students to eliminate incorrect answers as in item A,2.
4. Provide additional practice with diagram-type questions from previous exams.

C. Essay Questions

1. Train students to write brief outline before answering essay-type questions.
2. Teach students to follow instructions and note directions, e.g., discuss, describe, state, list, compare, contrast, show connection, evaluate.
3. Topic sentence should begin with words from the question.
4. Underline key words in question.
5. Reread to make certain the question has been answered.

D. Reviewing a Particularly Difficult Unit

1. Plan another lesson to review questions in this unit.
2. Reteach difficult topics from a new perspective or with different materials or methods. Use charts, transparencies, tables, etc. which will help.
3. Bring in sets of questions that concern this area of learning.
4. Stress only topics within the unit that seem to be troublesome.
5. Use textbooks and class notes to help students find answers to troublesome questions.

E. Preparation Techniques

1. Devote some part of class time to stressing the best techniques for handling the particular format of the examination.
2. Train students to select the set of questions which they are most likely to answer correctly.
3. Train students to write a brief outline before beginning an answer.
4. To review content, the use of essays rather than the short answer questions is more productive. The review of short answer questions is useful only in developing skill in the process of attacking the problem, first by eliminating the most unlikely distractors and then by making the final choice from two possible answers. The essay type organizes large masses of material and is therefore better for review purposes.

Review Lesson for a Test-Writing an Essay

AIM: How should I begin to answer an essay question?

I.O.: In answer to a Regents literature question, students will be able to write a topic sentence which incorporates the major aspects of the question.

Development	Content
1. Motivation: Distribute literature questions from English Regents. Student reads question aloud.	1. Key words in the question: extreme action; reason listed below; two books; specific references; titles and authors' themes, characters, conflict
2. How do you approach the question?	
3. What are the key ideas in the question? the key words?	2. Choose a book that fits the question.
	3. Outline answer briefly.
4. What would you do for each?	
5. What specific references to the book we are reading now would you choose to support your statements?	
6. What is a good topic sentence? How does this question suggest the topic sentence?	

Application:

Students write topic sentences based on their notes. Check work and correct as needed. Have good ones placed on board for evaluation.

Assignment:

Read question 2. Underline the key words. Choose a book to write about, jot down the information you need to write the essay, and frame a satisfactory topic sentence only.

Literature Questions From Former Regents Examinations:

1. Often a person takes extreme action for a reason listed below. From the novels, full-length plays, and full-length biographies you have read, choose a total of two books. In each case, by specific references to the book, (a) point out the extreme action which a person (or persons) took and (b) show that he (or they) took his action out of self-interest, strong emotion, moral or political conviction, or opposition to a culture different from his (or their) own. Give titles and authors.

2. The appeal of a novel, play, or film may be that it presents a person who, like a real human being, has several facets to his character. That is, the person possesses more than one characteristic or trait. From the novels, full-length plays, and feature-length films you have read or seen, choose a total of two works. (You may choose only one film.) In each case, give the name of a person in the work and by specific references show two characteristics of traits which he possesses. For books, give titles and authors; for the film, give the title.

3. A close relationship may exist between the two persons for a reason such as the following: the persons share a common goal; the persons have an interest in common; the persons are opposites who are attracted to each other; or, one of the persons satisfies a need of the other. From the books (full-length) that you have read, choose a total of two. (or for one book, you may substitute a full-length motion picture.) In each case, briefly describe the close relationship between the two persons and, by specific references, show that it exists for one of the above reasons. For books, give titles and author. For movies, give the title.

4. Often one person brings great happiness or great distress to another person, or even to a community or a nation. From novels, full-length plays, and other full-length books you have read, choose a total of <u>two</u>. In each case, identify a person in the book and show by specific reference that he or she brought great happiness or great distress to another person, to a community, or to a nation. Give the titles and the authors.

Review Lesson After a Test

AIM: What errors did I make?

I.O.: The student will be able to

a. compare his performance with the class distribution of grades
b. correct errors on his test
c. do examples similar to problems on the test without making errors.

Guiding Principles for a Review Lesson after a Test:

Most review lessons are productive and economical of instructional time only after

1. an item analysis is made
2. the major, common errors highlighted by the item analysis form the subject matter for instruction

N.B. The resourceful teacher will find ways of helping students understand individual errors.

Development	Content
1. Motivation a. Return exams. Note the distribution of grades and the right answers. b. Use overhead projector to flash on screen: 1. grade distribution chart 2. list of correct answers to both forms of exam c. Figure out where you made your mistakes d. 5 minutes for individual correction, teacher answering questions. e. Many students had difficulty with problems 5,6, and 8. Let's take a closer look at the way these problems are solved on the board.	1. Two students put problem #5 on board (2 methods, correctly done) and explain work. 2. Place problem #6 on board and copy incorrect student solution.
2. Problem #5: a. Two students explain their method on #5. b. What are the skills necessary to solve problem using method 1? method2? c. Which method appears to be more efficient? Why? d. Drill: Simplify: $\dfrac{\frac{5}{x} - \frac{6}{x}}{1 - \frac{4}{x}}$	

3. **Problem #6:**

a. How did student try to solve #6?
b. Compare it to your answer.
c. What is the most efficient order in which to factor?
d. How do we find an LCD?
e. Drill: Correct your own #6. Do #3 from other form of exam

3. **Place on blackboard:**

$$\frac{x^2 + x}{x^2 - x - 20} - \frac{x}{2x - 10}$$

$$\frac{x^2 + x}{(x - 5)(x + 4)} - \frac{x}{2(x - 5)}$$

$$\frac{x^2}{(x - 5)(x + 4)}$$

4. **Problem #8:**

a. When can we multiply to get rid of denominators?
b. Which procedure is incorrect?
c. How can we correct A?
d. How is B different from A?
e. How can we find the values of x that make the fractions meaningless?
f. Drill: Correct your own exams: 8a, 8b.

A. $\frac{5}{x - 2} = \frac{3}{x}$

$= \frac{5(x)(x-2)}{(x-2)} - \frac{3(x-2)x}{x}$

$= 5x - 3x + 6$

$x = 3$

B. $\frac{5}{x-2} = \frac{3}{x}$

$\frac{5(x-2)x}{(x-2)} = \frac{3(x)(x-2)}{x}$

$5x = 3x - 6$

$2x = -6$

$x = -3$

Summary:

What major mistakes do you think most students made in problems 5,6, and 8?

Assignment:

a. Read pp. 98-99, 102-103, 115-117.
b. Do pp. 99-100/3, p. 104/17, 19; pp. 117/12.

N.B.: Where essay questions are used, the best answers should be flashed on the overhead projector or written on the chalkboard for analysis.

Skills Lesson

AIM: How should the two-handed chest pass be thrown for greater speed and accuracy?

I.O.: The student will be able to perform a two-handed chest pass, which will be incorporated into game situations.

Materials: Basketballs, backboards and baskets, clear surface area

Development

1. Motivation:

   a. When is the two-handed chest pass a useful substitute for dribbling? An offensive technique against a zone defense?
   b. Students demonstrate the chest pass. What did they do?

2. Mimetic Drill:

   a. One: hands in front of chest, palms facing outward, elbows close to body
   b. Two: elbows raised sideways, wrists rotated inward at chest
   c. Three: snap wrists as you extend arms and step forward
   d. Four: brings hands to side and feet together
   Note: Ball is to be received at chest height.

3. Medial Summary: Ask for volunteer to perform skill.
   Evaluate the performance: positions of hands; arm movements; leg movements; follow through.

4. Application:

   1. Form a circle with 8-10 students and a leader in the middle.
   2. Leader passes ball to student 1, who then passes it back to leader.
   3. Leader then passes ball to student 2, who then passes it back, and this sequence continues.
   4. Once all students in circle have received and passed ball, the group rotates, with the leader becoming student 8, student 7 becomes 6...and student 1 becomes the new leader.
   5. As students are working in groups the teachers circulate to correct errors and commend the best passes.

Summary:

1. Which step of the process are they doing best?

   a. height at which ball should be passed
   b. arm movement with relation to ball velocity
   c. associated leg movements
   d. efficiency of chest pass with relation to long or short pass
   e. target with relation to moving teammate

2. Which steps are most difficult? in need of most practice?

Library Techniques

AIM: What is the best way to find a biography in the library?

I.O:
1. To identify biographical and autobiographical books
2. To determine how these books are arranged on the shelf
3. To locate and select a biography to read for the English class outside reading assignment

Materials: Enlarged sample catalog cards, selected biographies on book truck

Development

1. Motivation: Here is a copy of People magazine. Why is this magazine so popular?
2. What is the difference between a biography and autobiography?
3. Why would the label on the spine of this book say B?
4. Here is a biography of Muhammed Ali by Robert Lipsyte. How would you find this book on the shelf?
5. Here is sample card from our card catalog. Let's "translate" the information.
6. Your science teacher asks you to read a biography of a chemist. Where would you find such books?
7. Find a biography you think you would like to read. What factors would you consider in making your choice?

Content

1. A biography is an account of someone's life. When someone writes an account of his own life, it is called an auto-biography.
2. Biographies are arranged alphabetically by the name of the person about whom it is written.
3. The label identifies "B" for biography, the person's name underneath.
4. The card catalog lists subject headings with a subheading, "Biography".

Summary:

1. Which chapter do you think would be most interesting? Why?
2. Judging by the heading, is there any chapter you might omit? Why?

Class Trip

AIM: How can we benefit most from our class trip to a museum?

I.O.: Students will be able to identify orally and in writing the difference between Spanish and Spanish-American Art.

Materials: Audio-visual equipment: Selected 35 mm slides obtained from Hispanic Museum and/or the Museum of the American Indian collections, projector, and screen

Development

1. Motivation: Some critics say that Spanish-American Art is not original. How can we find out?

2. Show a series of slides depicting Spanish Art. Then show another series (5-8) of slides depicting Spanish-American Art.

    a. What are the main characteristics of classical Spanish Art as seen in the slides?
    b. What are the main characteristics of Spanish-American Art?
    c. What are the important differences between Spanish Art and Spanish American Art? the similarities?
    d. To make the trip most profitable and enjoyable, what guidelines or rules should we consider?

Summary:

List the special characteristics of Spanish and Spanish-American Art in two columns on your worksheet.

Application:

I will show you 10 pictures or slides. Identify the group to which each work of art belongs.

Assignment:

After the trip, in several well constructed sentences in Spanish, defend your stand as to whether or not Spanish-American Art is distinctive from Spanish Art. Cite specific examples.

Integrating Reading and Writing Components

Curriculum specialists have long advocated the integration of reading and writing components across the curriculum. The advent of Competency Tests makes such integration increasingly urgent.

In the following section, sample lesson plans in English, Social Studies and Science demonstrate how reading and writing activities can be taught without diminishing content.

* denotes reading activity

\+ denotes writing activity

Integrating Reading and Writing Components

(previous assignment: read pp. 81-113 in The Catcher in the Rye)

AIM: Why do people do things that are self-destructive?

I.O.: The students will explain in writing the reasons why Holden got into dangerous situations.

Development:

1. Motivation: You and your friends have sometimes gotten into a dangerous situation.

   a. Tell us about it.
   b. Why did you let yourself get into that situation?

2. To what extent did Holden's situation parallel yours?
3. What were his motives in choosing the hotel?

   a. in behaving as he did in the bar?
   b. in asking Maurice to find him a prostitute?
   c. in responding to the prostitute?

* 4. How does he feel when he goes to the prostitute's room?
   Read the passage (p. 94) that describes his feelings.
5. What happens in the room?

Summary:

Imagine yourself a counselor, discussing his self-destructive feelings with Holden. What advice would you give him?

Assignment:

\+ 1. Write what you would say in 1-2 paragraphs of 150 words.
2. Read pp. 113-157. What other self-destructive acts does he commit?

Integrating Reading and Writing Components

("An Occurrence At Owl Creek Bridge" - Ambrose Bierce)

AIM: To understand the attitude toward death of Ambrose Bierce

I.O.: Students will demonstrate their understanding of statement and inference by listing three things that are stated and at least three things that may be reasonably inferred.

Development:

1. Motivation: Most of us have had some experience with death. We all remember the recent death of _____(John Lennon or other famous person). What went through your mind at the moment you learned of his death?
2. What might have gone through his mind?
* 3. How did Peyton Farquar feel at the moment of his death? Cite evidence.

   a. What are we told of the reason for hanging Peyton Farquar?
   b. What can we infer?
   c. What does paragraph three reveal about his character? Be specific.

* 4. In the opening three paragraphs everyone is silent. Reread these paragraphs.
   What effect is achieved by the absence of dialogue? Cite evidence.

5. Note the three-part storyline. What is the purpose of each part?

Summary:

This story is not literally realistic. To what degree is it psychologically realistic?

Assignment:

+ 1. In a critical essay of 150-200 words, compare "An Occurrence At Owl Creek Bridge" with "Chickamauga" and "The Mockingbird" with reference to purpose and theme.
2. Read "The Death of Ivan Ilyich".
3. Was Ivan Ilyich's death suitable content for a short story? Justify your answer.

Integrating Reading and Writing Components

AIM: Should I join a labor union?

I.O.:
1. Students will be able to list five goals of a labor union.
2. Students will be able to explain at least three reasons for and against joining a labor union.

Development

1. Motivation: If you get a job in the future where you have a choice of joining a labor union, would you willingly become a member of that union?

2. Last night, you read the story of Anatanas Kastauskis.
   a. How would Anatanas react to your choice?
   b. What is a labor union?

3. Do you agree with Anatanas Kastauskis?

* 4. How does the poem on page 154 (Economics for Young Adults) help to explain the purpose of a labor union?

5. From the story of Anatanas Kastauskis, what would you give as the most important goals of a labor union?

* a. Examine pp. 167-168 (Economics for Young Adults).
   b. Which fringe benefits are most important to you?

* 6. Examine the graph on page 160 (Economics for Young Adults).
   a. What does the graph tell you?
   b. How do you explain the tremendous growth of labor unions as shown on the graph?

Summary:

Let's go back to our original question. Would you join a labor union?
   a. Why?
   b. What factors affect your decision?

Content

A. Reasons for joining a union
   1. Basic goals of unions
      a. bargain collectively with management
      b. improve wages and hours
      c. improve working conditions
      d. protect job security
   2. Fringe benefits
      a. pensions
      b. paid vacations
      c. sick leave
      d. health insurance
      e. protection from injury on the job
      f. grievance machinery
      g. job seniority

B. Reasons for not joining a union
   1. Limits on choices
      a. closed shop
      b. agency shop
   2. Undemocratic nature of some unions
      a. controlled elections
      b. relations with criminal elements

* Homework: Do A or B.

A. You are a labor union organizer. Write a brief paragraph appealing to workers to join your union.
B. You are president of a company threatened by a strike. Write a paragraph appealing to the workers not to strike.

Integrating Reading and Writing Components

AIM: Was the period between 1781 and 1789 a "Critical Period?"

I.O.: To be able to write a letter to a state representative, arguing for or against amending the Articles of Confederation.

Development

1. Motivation: A cartoon drawn on the chalkboard showing a boat (United States) on the river (Independence) headed for falls and a breakup with thirteen oarsmen (the states) rowing in different directions.

   What is the cartoonist attempting to say?

2. Is this cartoon a valid picture of the period 1781 - 1789?

* 3. Why did John Fiske call this a "Critical Period"? Read Viewpoints: USA, #26, pp. 47-48.

4. Why was the government unable to deal with this situation?

5. What was the most serious problem?

Content

A. Not a Critical Period

   1. Important legislation enacted, e.g., Northwest Ordinance
   2. Post-war depression receding by 1787
   3. War record and economy good
   4. Shift of western lands to Confederation

B. Evidence for Fiske view of Critical Period

   1. Economic and social post-war problems

      a. inflation with loss of specie and use of paper money
      b. unemployment with loss of foreign markets
      c. farm foreclosures
      d. interstate trade and tariff wars
      e. veterans riot to secure pay for military service rendered in Revolution
      f. domestic unrest - Shay's Rebellion

   2. Weakness of Articles of Confederation

      a. Confederation of sovereign states
      b. lack of independent executive or judiciary
      c. 9 of 13 states needed to pass laws
      d. unanimous vote needed to amend Articles

e. no taxing power

1. requisitions not honored by sovereign states
2. inability of Confederation to pay for the responsibilities given it
   a. army
   b. treaties and alliances
   c. borrowing money

f. no power to regulate interstate and foreign commerce

1. dumping of foreign goods
2. interstate tariff wars

Summary:

Some historians believe that, had there not been a post-war depression, the Articles of Confederation would have succeeded had it merely included the right to levy taxes and regulate interstate and foreign commerce. Do you agree or disagree? Why?

Assignment:

+ Imagine you are living during this "critical period." Write a letter to your state representative, arguing for or against amending the Articles of Confederation. Defend your position.

Integrating Reading and Writing Components

AIM: Should I stop smoking?

I.O.: The student will be able to write a paragraph, including three reasons why smoking is harmful.

Equipment: Tissue, cigarette, match, American Cancer Society pamphlet, graph illustrating rate of lung cancer among smokers and non-smokers

Development:

1. Motivation: Teacher blows cigarette smoke into a tissue. Examine this tissue. What do you observe?

2. How does this affect you?

3. How do normal lungs and lungs with lung cancer and emphysema differ?

* 4. Why will smokers in the class probably die sooner than the rest of us? Read section on "Smokers Die Younger".

5. Why should pregnant women not smoke?

Summary:

Someday you may be a parent. Would you permit your son or daughter of high school age to smoke?

* **Assignment**:

For homework, re-read the pamphlet and write a report of at least two paragraphs on "Cigarette Smoking is Suicidal".

\+ **Extra Credit**:

Your Principal is considering a ban on smoking in front of the school where students congregate while waiting for their first period. You have been invited to present your views to the Consultative Council. In a three-paragraph composition of 200 words, express your views.

Integrating Reading and Writing Components

Lesson Topic: Dehydration Synthesis and Hydrolysis of Sugars

I.O.: To define and compare dehydration synthesis and hydrolysis

Development

1. **Motivation:** Place on board

$$\begin{array}{r} C_6H_{12}O_6 \\ C_6H_{12}O_6 \\ \hline C_{12}H_{22}O_{11} \end{array}$$

   a. What is wrong with my math?
   b. Although this arithmetic is incorrect, this is what actually happens in the body. How can this be so?

2. You visit the doctor and he does a urinanalysis for sugar. He used Benedict's solution as a test reagent.

   a. Perform Benedict's test with glucose and maltose.
+ 1. Describe what you observed.
   2. How are these results different?

   b. What are the empirical formulas for glucose and maltose?
* 1. Read - Kraus, Concepts in Modern Biology, page 36, column one to end.
   2. What is the difference between them?

   c. How do the expected results differ from the actual results?
   1. What atoms are missing?
   2. What can these three atoms combine to form? Let's see how two molecules actually combine.
   3. Write the chemical equation, using empirical formulas, for this reaction.

* d. Examine the structural equation in the diagram. What do you see happening? Read Kraus, p. 37, Fig. 2-24 top
   e. Why is this process called dehydration synthesis?
   1. What is a hydrant?
   2. Refer to the diagram, Fig. 2-24. What do you see?
   3. What is the name of the process shown on page 37 in the downward direction?

   f. Why did Benedict's test produce a positive result with glucose and not with maltose?
   g. Refer to page 37.
   1. Why are there two arrows in the diagram?
   2. How can you change one maltose molecule back to two glucose molecules?

+ **Summary:**

Write a brief statement comparing dehydration synthesis and hydrolysis. Use words: putting together, small molecules, larger molecule, removal, water, reverse reactions, broken down, addition.

Assignment:

A. Read - "Carbohydrates", pp 35-37

B. Extra for experts:

\+ 1. When President Reagan was shot, why was he given an intravenous feeding of glucose instead of maltose?

\+ 2. What would have happened to him had he been given maltose?